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Subject : TRAF-Oil Surface Treatment on Fuel Cam and Exhaust Cam for UEC Type Engines	Application	UEC Diesel Engine
	Type	All UEC (Except Eco)
	No.	USI-25501E Rev.1
If necessary		

When running direction is changed over from Ahead to Astern and vice versa in UEC engines operation, the camshaft is moved in axial direction and rollers become moved relatively on cam surfaces.

For this reason, molybdenum disulfide is coated on the cam surfaces as a solid lubricant in order to reduce the friction resistance between cam and roller, but it may be observed in some cases that sliding score marks occur on cam surfaces with rollers due to entering foreign materials and/or worn during longer operation.

In order to prevent this kind of problem, it is recommended that visual inspection should be periodically carried out on the parts in question and also the following TRAF-Oil surface treatment should be carried out at the maintenance work in each docking period.

1. This treatment is the method that a metal surface is made porous up to depth of about several microns by using special chemical liquid and molybdenum disulfide is made to penetrate in the porous zone, that is, a kind of solid lubricant film is made to form on the metal surface. And, this treatment can be carried out in room temperature.
2. Procedure of the treatment:
 - 1) The treatment can be carried out in room temperature, but the surface temperature is not to be over 70°C.
 - 2) Cover the part except for treating part inside the cam case in question by using plastic sheets and rags.
 - 3) Smoothen scratches or roughening on the surface with oil stone or plastic grindstone.
 - 4) Remove grease completely on the treating surface by thinner or detergent for PT (liquid penetrant testing). This is important.
 - 5) Pour chemical liquid "TRAF-OIL 7W" into a small container.

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Plan record	Newly issued. 9th Nov. 2018	Approved	<i>K. Yoshida</i>	SERVICE ENGINEERING DEPARTMENT
	MSI-0264E (20th May 2002)	Checked	<i>H. Hirabayashi</i>	SERVICE ENGINEERING SECTION
	Rev.1 Added P.3 24th Feb. 2021 K.Y, H.H, D.Y	Designed	<i>D. Yasuda</i>	DATE OF REVISED :24th Feb. 2021

- 6) Cut cotton cloth (bleached cloth) to a size of treating surface, and soak the cloth in the chemical liquid 7W and stick it on the treating surface. (Put on thin rubber glove.)
- 7) In a minute, bubbles occur between cotton cloth (bleached cloth) and treating surface.
- 8) Rub the cloth by using the brush dipped in the small container of 7W liquid so as to push out the bubbles. If bubbles do not occur, use new 7W liquid since it is deteriorated.
- 9) Apply 7W liquid on the cotton cloth (bleached cloth) by using the brush so as not to dry the cloth surface. Continue this work patiently for 20 to 30 minutes.
- 10) After use the 7W liquid, throw away the liquid in the small bottle. Do not put it back to its original keeping container.
(Ingredients of 7W liquid are phosphoric acid 90% and phosphate ammonia 10 %.)
- 11) Remove the cotton cloth (bleached cloth) and wipe uneven and roughened area of treating surface by using cotton cloth or clean waste cloth while the surface does not become dry. The treating surface discolors to black.
- 12) Stir the liquid in the bottle of TRF-OIL 3W Aceton by shaking the bottle well and then coat 3W Aceton liquid on treating surface uniformly by using a small brush (writing brush). Since this 3W Aceton liquid has very strong volatility, shut the cap of the bottle of the liquid at each time even in using.
- 13) After applying 3W Aceton liquid, sufficiently rub in on the surface with leather gloves or fine-mesh cotton cloth. Time for rubbing-in 3W Aceton is about 5 minutes as a standard.
- 14) Confirm that there are no small projections on the boundaries between treated surface and non-treated surface.
If the boundaries are not smooth, repair it with Scotch bright sheet, etc.
- 15) Remove cover sheets for preventing dust from entering into the cam case.
Be careful that 7W liquid accumulating on the sheets is not to be spilled in the cam case.

3. Notes:

- 1) When handling the TRF-OIL 7W liquid, use rubber gloves, gas mask and goggles. If the liquid sticks on skin, wash it as early as possible.
- 2) Fine-mesh bleached cloth is most suitable for cotton cloth in use. Coarse-mesh cloth like gauze is not suitable because treating surface becomes roughened.
- 3) TRF-OIL 7W and TRF-OIL 3W Aceton have to be stored in the cool room air conditioned and the caps of the containers of the liquid have to be shut securely.

In addition, you are kindly requested to order this surface treatment work or supply of the liquid for the treatment to our company.

It is difficult to send this liquid by air freight because the liquid must be treated as dangerous goods.

Therefore, you are kindly requested to order with enough time margin for transportation.



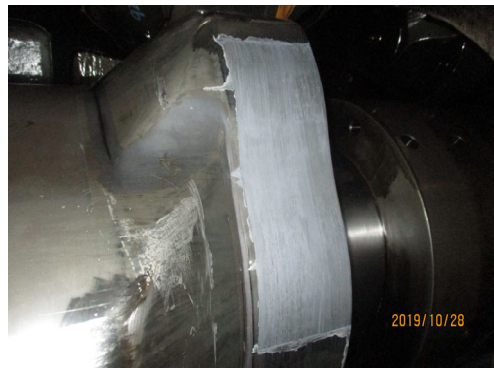
Apply 7W on the cotton cloth by using the brush



The treated surface after applying 7W



Applying 3W Aceton



The treated surface after applying 3W Aceton



Rubbing in on the surface with leather glove



The treated surface after rubbing in